

व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT

संख्या/ No.: SR.Comb. : 152/2862/2022

माह/Month: June, 2022

**THIS TEST REPORT VALID UP TO : 30<sup>th</sup> June, 2029**



**BALKAR-856, TRACTOR OPERATED  
STRAW REAPER COMBINE**



सत्यमेव जयते

भारत सरकार

**Government of India**

कृषि एवं किसान कल्याण मंत्रालय

**Ministry of Agriculture and Farmers Welfare**

कृषि एवं किसान कल्याण विभाग

**Department of Agriculture and Farmers Welfare**

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

**Northern Region Farm Machinery Training and Testing Institute**

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x)	Stone trap mechanism	Provided
xi)	Height of cut	By adjusting hitch height
xii)	Any other adjustment	--

### 8. LABORATORY TESTS

Material analysis: The hardness and chemical analysis with respect to critical components are given in Table-3 & 4 respectively.

**Table-3: Hardness of critical parts:-**

Sr. No.	Component	Material	Hardness observed (HRC)	
			Hardened zone	Remainder zone
1	Cutter bar blade	High carbon steel	58.1	31.3
2	Knife guard	High carbon steel	233 (HB)	
3	Knife back	Mild carbon steel	230 (HB)	
4	Chopping cylinder blade	High carbon steel	59.5	23.7
5	Concave blade	High carbon steel	59.2	16.9

**Table-4: Chemical analysis of critical components**

Sr. No.	Component	Primary element(%) by weight				
		Carbon	Manganese	Silicon	Phosphorous	Sulphur
1	Knife blade	0.49	0.47	0.60	0.00	0.18
2	Knife guard	0.29	0.52	0.84	0.00	0.27
3	Knife back	0.16	0.54	0.88	0.00	0.27
4	Chopping cylinder blade	0.51	0.46	0.63	0.00	0.18
5	Concave blade	0.55	0.58	0.49	0.00	0.16

### 9. FIELD TEST

The straw reaper combine was operated with Swaraj 855 tractor at engine throttle setting corresponding to 540 PTO rpm was tested in the field for 38.43 (including running-in 1.0) hours for reaping of left over straw & stubbles after wheat harvesting by grain combine harvester. During tests, field performance of straw reaper was assessed with regard to quality of work, rate of work, fuel consumption, safety and soundness of construction etc. The crop parameters, atmospheric conditions and performance parameters as observed during field tests are also given in **Annexure-I & II** and summarized in Table-5 & 6.

**Table-5 : Summary of field crop conditions**

Sr. No.	Parameters	Range of parameters
1.	No. of tillers, m <sup>2</sup>	294 to 349
2.	Manually recovered straw, g/m <sup>2</sup> (Stubbles only)	303.03 to 317.27
3.	Moisture content of straw, %	6.50 to 9.00
4.	Loose straw, g/m <sup>2</sup>	140.97 to 162.30
5.	Height of stubbles before harvesting, mm	264.40 to 312.20
6.	Height of stubbles after harvesting, mm	57.90 to 78.30

**Table -6 : Summary of field performance test**

Sr. No.	Observations	Range of observations
1.	Speed of operation, kmph	2.22 to 2.30
2.	Width of cut, m	2.24 to 2.28
3.	Overlap,%	3.39 to 5.08
4.	Rate of work, ha/h	0.411 to 0.431
5.	Fuel consumption l/h l/ha l/t	5.90 to 6.07 13.81 to 14.58
6.	PTO power consumption, kW	34.09
7.	Average length of straw, mm	7.65 to 8.93
8.	Straw split,%	96.80 to 97.10
9.	Straw recovery,%	81.61 to 82.92
10.	Grain recovery,%	54.11 to 66.84

### 9.1 Ease of operation

No noticeable problem was observed during operation of straw reaper.

### 9.2 Quality of wheat straw: Satisfactory for animal feed.

### 9.3 Labor requirements

One man hour was required for daily maintenance of tractor and straw reaper. One skilled operator is needed to operate tractor with straw reaper.

## 10. WEAR OF CRITICAL COMPONENTS

The wear of serrated blades of chopping cylinder and concave was measured after completion of 38.43 hours of wheat straw harvesting.

Percentage wear on mass basis were computed and the results are given below in Table - 7

**Table-7: Wear assessment of blades on mass basis**

### 10.1 Concave blade

Sr. No.	Concave		
	Mass before test (g)	Mass after test (g)	Wear (%)
1	92.1	91.5	0.65
2	91.1	90.6	0.55
3	90.7	90.1	0.66
4	93.2	92.5	0.75

### 10.2 Chopping cylinder

Sr. No.	Chopping cylinder		
	Mass before test (g)	Mass after test (g)	Wear (%)
1	69.3	68.7	0.87
2	69.4	68.9	0.72
3	69.1	68.6	0.72
4	67.7	67.2	0.74
5	68.0	67.5	0.74
6	69.3	68.7	0.87
7	68.0	67.5	0.74

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13	Reel type	Pick up tyne	Provided	Conforms
14	Diameter of tyne bar, mm	20 (Min.)	27	Conforms
15	Arrangement for forward and backward movement of reel	Must be provided	Provided	Conforms
16	Labeling of lubricating points	Must be provided	Provided	Conforms
17	Marking/labeling of machine	The labeling plate should be riveted on the body of machine having name & address of manufacturer, country of origin, make, model, year of manufacture, serial number, size, required size of prime mover (kW/Hp)	Provided	Conforms
18	Literature	Operator manual, service manual & parts catalogue should be provided.	Provided	Conforms

**Note:** The implementation of critical technical specifications has been deferred till 30.09.2022 vide Ministry's O.M No. 13-1/2021- M&T (I&P) dated 03.02.2022.

### 13. COMMENTS & RECOMMENDATIONS

- 13.1** Drive safety clutch for chopping cylinder are not provided. It **MUST** be provided.
- 13.2** The construction of PIC and PIC shaft does not meet the requirement of IS: 4931-1995. It **MUST** be looked into for corrective action.
- 13.3** Provision against overload and safety guard on power take off drive shaft is not provided. It **MUST** be provided.
- 13.4 Visual observations and provision for adjustments**
- i) The provision for following adjustment on straw reaper is not provided. It should be provided.
- a) Adjustment of speed of chopping cylinder, blower, reel, screen slope, sieve clearance & cutter bar.
- b) Adjustment of air displacement.

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